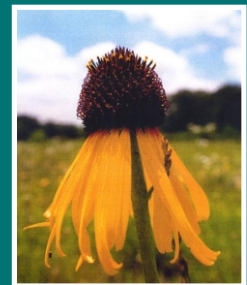
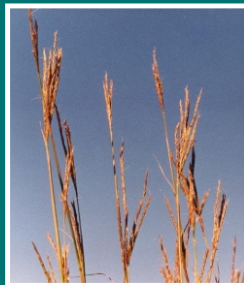




Roadside ***Vegetation Management***



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Missouri Department of Transportation



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Roadside Vegetation Management

The Missouri Department of Transportation's (MoDOT) roadside management philosophy is to preserve, enhance and diversify the roadsides of Missouri's transportation system. Our roadside management program helps keep Missouri roadsides safe and attractive. This program establishes and maintains appropriate roadside vegetation to control erosion, restrict growth of undesirable vegetation and to improve the total driving experience for all Missouri motorists. This is effectively accomplished through several methods, including an effective herbicide program, fertilization, mowing, brush control and litter removal. Wildflower and native grass plantings, landscaping and the use of naturalized vegetation are also part of maintaining and improving safety and roadside appearance. Combining different management practices, such as these listed, form an Integrated Roadside Vegetation Management (IRVM) program.



Roadside Vegetation Management Policy

Vegetation in sight distance areas shall be controlled as necessary on all routes.

Equipment shall not be used on slopes steeper than 3 to 1 unless designed for that purpose. Reliable, manufactured slope indicators shall be used on all mowing equipment. (Figure 1)

New trees or hardscape features shall not be permitted within 30 feet from the nearest traveled way.

Vegetation shall be removed that interferes with the visibility of MoDOT signs.

Traffic control shall be performed according to the most recent edition of MoDOT's Traffic Control for Field Operations manual.

Noxious weed control shall be done on all routes, as required by federal, state and county laws and regulations. Noxious weed control shall be by either chemical or biological means.

Vegetation management practices shall not conflict with efforts to protect state and federally designated endangered species. Refer to Heritage Database Information. Contact MoDOT's intermediate environmental specialist Alan Leary at (573) 526-6678 for assistance.



Type I Management Area Guidelines ***(High Profile Areas)***

These areas include raised medians, islands, roadside parks, commuter parking lots and high profile areas with considerable pedestrian traffic. These locations require the highest level of vegetation management and cleanliness. Vegetation should be maintained in a turf-type manner with heights of vegetation maintained between 4 and 8 inches.

Typically, this turf should be mowed with walk-behind mowers, lawn-type mowers and line trimmers.



Type II Management Area Guidelines ***(Fully Developed Areas)***

These areas include fully developed areas on all routes. The height of vegetation should be maintained between 6 and 12 inches. Mowing should begin when 50 percent of the vegetation reaches 12 inches in height.

The entire right-of-way may be mowed, allowed to naturalize, appropriately landscaped or a combination of the three. Slopes steeper than 3 to 1 should be maintained using plant growth regulators (PGR), landscaped, allowed to naturalize or mowed only with equipment designed for slopes.



Type III Management Area Guidelines ***(Undeveloped Areas on Divided Highways)***

These areas include all undeveloped areas on divided highways. The height of the vegetation should be maintained between 6 and 18 inches. Mowing should begin when 50 percent of the vegetation reaches 18 inches in height.

Slopes steeper than 3 to 1 and areas not required to be mowed should be planted to wildflowers and native grasses, encouraged to naturalize or landscaped.

MEDIANS (Figures 2 and 3)

Vegetation control (PGR or mowing) should be done on all medians less than 100 feet in width. Medians 100 to 150 feet in width may be managed at the district's discretion and is dependent on the type of terrain. When the median is over 150 feet in width, vegetation control may be completed out to a distance of 30 feet from the edge of the nearest traveled way. This is intended to be one pass with the type of equipment used.

INTERCHANGES (Figure 4)

Mowing interchanges requires a large resource commitment. Each interchange should be evaluated as to the extent of vegetation control needed. Vegetation control (PGR or mowing) may be done on the interior of interchanges, if necessary, where slopes are 3 to 1 or flatter. It may extend to 30 feet from the edge of the nearest traveled way. This is intended to be one pass with the type of equipment used.

MAIN ROADWAY

Vegetation control (PGR or mowing) along the outside shoulder may be completed out to a distance of 30 feet from the edge of the nearest traveled way. This is intended to be one pass with the type of equipment used. Do not leave a narrow strip (less than 30 feet) between the main roadway and outer roads.



Type IV Management Area Guidelines ***(Undeveloped Areas on Undivided Highways)***

(Figure 5)

The height of vegetation should be maintained between 6 and 18 inches. Mowing should begin when 50 percent of the vegetation reaches 18 inches in height.

Vegetation may be maintained by using PGR or by mowing. The area for control of vegetation should include a distance from 6 to 15 feet from the edge of the traveled way. This is intended to be one pass with the type of equipment used.

A final mowing may be done if the slopes are 3 to 1 or flatter. It should not begin until the chance of significant regrowth is minimal. The final mowing area may extend 30 feet from the edge of the traveled way. Right-of-way totaling 80 feet or less may be mowed if needed.

Slopes steeper than 3 to 1 and areas not required to be mowed should be planted to wildflowers and native grasses, encouraged to naturalize or landscaped.



Roadside Vegetation Management Best Practices

SAFETY

1. Personnel engaged in mowing should be trained in the operation of mowers and must be familiar with the applicable safety guidelines as set forth in MoDOT's Safety Policies, Rules & Regulations employee handbook.
2. Tractor tires should be set at the appropriate tread width and inflation that provides optimum stability. Always consult the operator's manual before making any adjustments to the tractor tires.
3. For safety concerns and appearance purposes, a cut should not be made on top of rock cuts or down from the top of an unmowed slope.
4. Dead trees and limbs, fallen or standing, which may create a hazard, should be promptly removed.

APPEARANCE

1. Mowing cycles and litter pickup should be planned to provide a desirable appearance at all times and especially for the Memorial Day, July 4th and Labor Day holidays.
2. Coordination of the mowing effort is important not only between areas but between districts, also, to ensure that similar routes will present the same appearance at the same time.
3. The transition between mowing widths and patterns will vary and should be gradual to give a natural and pleasing appearance.
4. All required trimming should be completed with each mowing cycle.
5. Visible litter should be removed prior to and after each mowing cycle.
6. Landowners should be allowed to mow the right-of-way adjacent to their property if they feel it will enhance the appearance of their property.

HERBICIDES

1. The Herbicide Manual should be used for guidelines for a herbicide program. The Herbicide Manual is available as a hard copy, on CD-ROM, or through the intranet on the Maintenance web site.
2. Undesirable weeds should be controlled by either chemical or biological means.

3. An effective herbicide program is a strong part of a properly managed roadside.
4. Herbicides may be used to keep sidewalks, paved slopes, paved islands, paved shoulders, commuter parking lots, drains, pavement joints, barriers, curb lines, paved ditches, etc. free of vegetation. If growth does occur in these areas, the vegetation should be removed.
5. Invasive plant species should be controlled that are considered mutually undesirable by MoDOT and adjacent landowners.

CULTURAL PRACTICES

1. Erosion control measures may be necessary if there is not adequate vegetation to prevent erosion or if operations require removal of vegetation and there is a possibility that silt will leave the right-of-way.
2. Fertilization and/or reseeding should be considered where difficulty in establishing vegetation is encountered.
3. Mowing height is the actual height of cut.
4. Do not mow when turf and soil conditions are wet to the point that turf damage or ruts will occur.
5. Native vegetation should be left standing and encouraged in areas that are prone to drifting snow. (Figure 6)
6. Desirable trees and shrubs should be pruned to promote proper growth habit.
7. Delayed mowing allows for seed production which may result in healthier stands of turf.

MISCELLANEOUS

1. Refer to your district roadside representative for assistance.
2. When mowing to the ditch line, it is acceptable to make a 5 to 8 foot cut on the back side of a V-ditch to help maintain drainage if it can be accomplished without placing the tractor on a slope steeper than 3 to 1. (Figure 7) However, for appearance purposes, a cut on the backside of the ditch should not be made. A preferred alternative would be the selective use of herbicides.
3. Areas of wildflower, native grass and tree plantings may be signed to indicate what is being accomplished at these locations.



Definitions

Biological Control: Usually involves the use of insects and disease-causing agents that attack certain weed species. An example is the control of musk thistle with the thistle head weevil. For effective biological control, the insect or disease must affect only the weed requiring control and the insects must have few natural enemies that interfere with their activity.

Brush: Coarse, woody vegetation growing in an undesirable location.

Chemical Control: The use of herbicides to control vegetation. Refer to Herbicide Manual.

Ditch Line: Ditch lines are considered to be to the back of a flat bottom ditch and to the bottom of a "V" ditch for roadside vegetation management purposes.

Divided Highway: Highway with physical separation of traffic in the opposite direction.

Endangered Species: Plants or animals considered by the state or federal government to be in danger of extinction or require protection to maintain their existence.

Fully Developed Areas: Areas where the surrounding land is dominated by housing developments and commercial properties. There are no large gaps of areas without housing or commercial development.

Hardscape Features: Landscape materials such as timbers, segmental block retaining walls and boulders that could create an obstacle if they are in an unprotected path of the clear zone.

Herbicide Program: Utilize appropriate equipment, herbicides and trained personnel for the application of products as specified in the Herbicide Manual. The objective is to control noxious and undesirable plant species, as well as manage plant growth by applications of plant growth regulators and side trimming.

Heritage Database Information: Location maps and specific species information about endangered species located within the state of Missouri. Refer to maps available in the districts. See the Maintenance Policy Manual, Section RDS(A4).

High Profile Areas: Areas with high traffic counts which may be subjected to idle viewing by the motorist and/or have considerable pedestrian traffic.

Integrated Roadside Vegetation Management (IRVM): A decision-making and quality management process for maintaining roadside vegetation that integrates the following:

- needs of the local communities and highway users;
- knowledge of plant ecology, design, construction and maintenance considerations;
- monitoring and evaluation procedures;
- government statutes and regulations and
- technology.

IRVM uses cultural, biological, mechanical and chemical pest control methods to economically manage roadsides for safety plus environmental and visual quality.

Invasive Plant Species: An aggressive plant species which tends to spread. This includes noxious weeds.

Islands: Areas surrounded by driving lanes, turn lanes or ramps, etc. They may be vegetated or paved. They may be at-grade or raised.

May: Permitted.

Median Width: Distance measured between the edge of traveled ways on a divided highway. The median width measurement includes the width of the inside shoulders.

Mowing Cycle: The amount of time to mow and trim an area or route from start to finish is one cycle.

Native Grasses: Grasses which occur naturally or were known to exist prior to European settlement. (Figure 8)

Naturalized Areas: Areas that have been allowed to flourish with native or noninvasive plant growth. These areas may have a random mix of what has established on its own or have selected vegetation management practices used to promote optimum desirable growth. (Figure 9)

Noxious Weeds: A plant which is troublesome and undesirable, and declared so by state law. Noxious weeds are: Canada thistle, Scotch thistle, musk thistle, purple loosestrife, marijuana, Johnsongrass, multiflora rose, kudzu, cutleaf teasel, common teasel, and field bindweed. MoDOT is thereby required by law to control these plants on right-of-way. The Johnsongrass law is subject to county option. Regardless of county option, the department shall make an effort to control this plant on right-of-way. Methods of control are specific to individual plants and MoDOT's Herbicide Manual shall be followed in developing control practices. Control efforts should be documented.

Noxious Weed Control: Documented efforts to reduce and possibly eradicate an undesirable or noxious weed. Efforts include both chemical and biological methods.

Plant Growth Regulators (PGR): A chemical which suppresses the top growth of a plant.

Raised Medians: Areas between driving lanes that may be grass or paved (or a combination) and are elevated.

Right-of-Way Line: MoDOT's property line between MoDOT and adjacent property owner.

Shall: Mandatory.

Should: Strongly recommended.

Sight Distance: All vegetation should be maintained at intersections and curves along state rights-of-way to maximize drivers' visibility. Most sight distances can be maintained by a clear view unobstructed by vegetation, along the main roadway approximately 6 to 10 feet from the edge of the traveled way. At intersections created by cross roads and gore points, the sight distance may need to be extended if necessary.

Slope Indicators: A mechanical device that operates on the same basis as a (bubble) level by indicating the degree of slope.

Traveled Way: Portion of the roadway intended for movement of motorized traffic. The white line strip on the edge of the road surface would typically designate this.

Trimming: Vegetation control to eliminate unsightly growth remaining after the mowing is complete. Includes line trimming, pulling and other manual means. Vegetation control under or around fixed objects within the mowed area. To manage vegetation in such a manner that keeps it consistent with the surrounding vegetation.

Undesirables: Vegetation which chokes out, shades out or competes with the intended vegetation at the given location. This will include any plant in the wrong place. Undesirables would include but not limited to chicory, giant ragweed, phragmites, spotted knapweed and others. Noxious weeds are included in this category. Several are listed in the Herbicide Manual.

Undeveloped Areas: Areas that don't fall within the fully developed area definition.

Undivided Highway: Highway with no physical separation of traffic in the opposite direction.

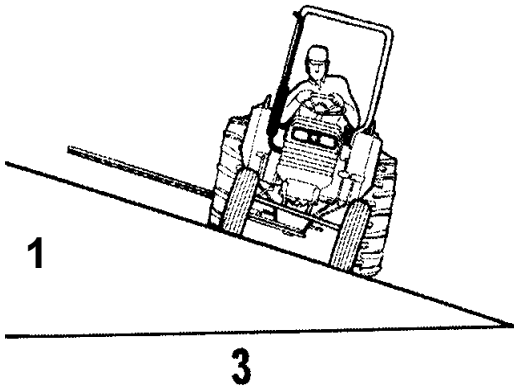
Visible Litter: Trash in a size or quantity noticeable to roadway travelers.

V-Ditch: Ditch with little or no flat bottom.

Wildflowers: Reoccurring broadleaf flowering plant in a naturalized area. (Figure 8)

Figure 1

Slopes Steeper than 3 to 1 and Slope Indicators

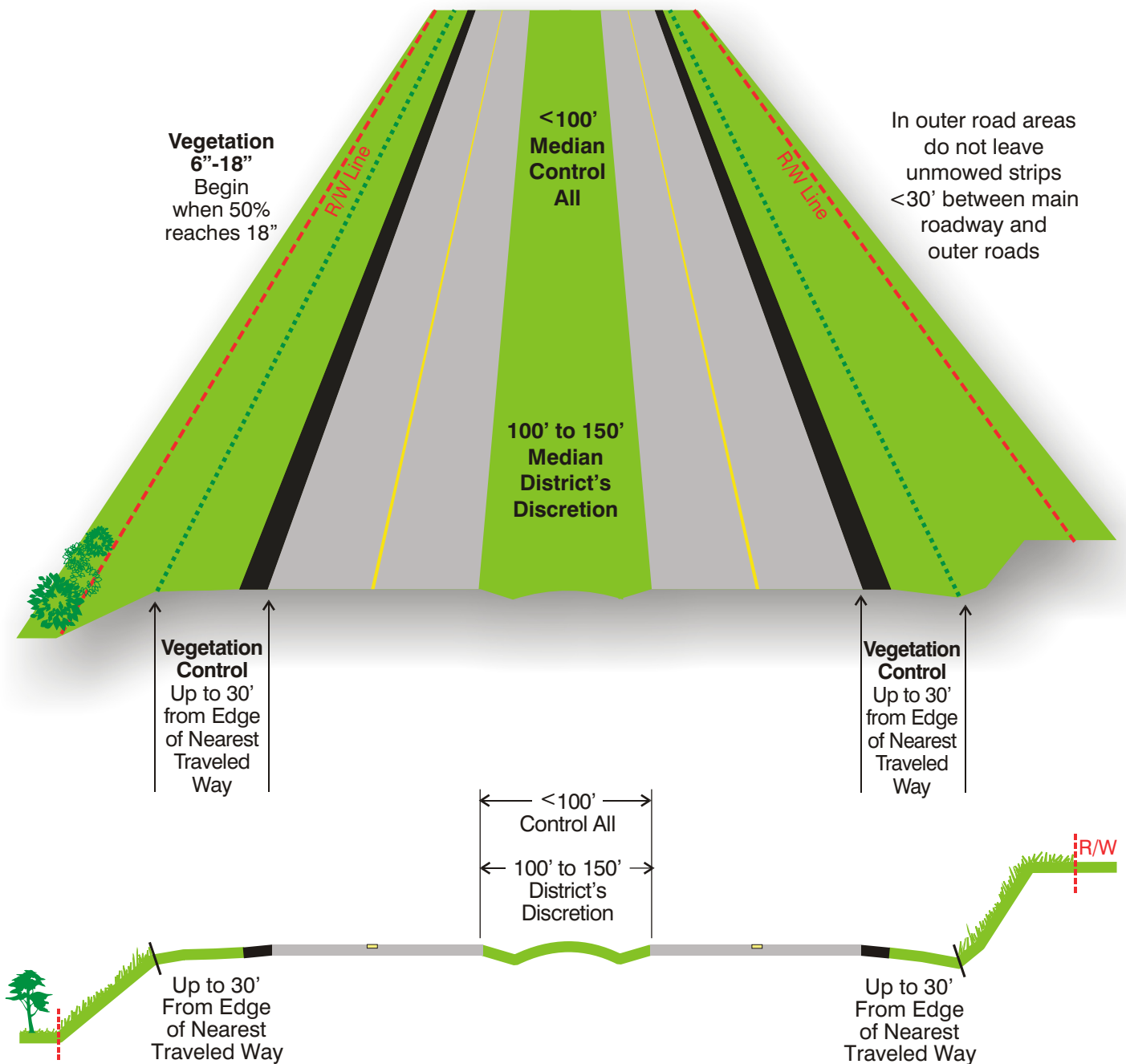


- Equipment shall not be used on slopes steeper than 3 to 1 unless designed for that purpose.



- Reliable, manufactured slope indicators shall be used on all mowing equipment.

Figure 2
Type III Management Area
 Undeveloped Areas on Divided Highways
 Medians Less Than 150' Wide



Vegetation control width
 is intended to be one pass
 with the equipment being used.

Figure 3
Type III Management Area
(Continued)
 Undeveloped Areas on Divided Highways
 Medians Over 150' Wide

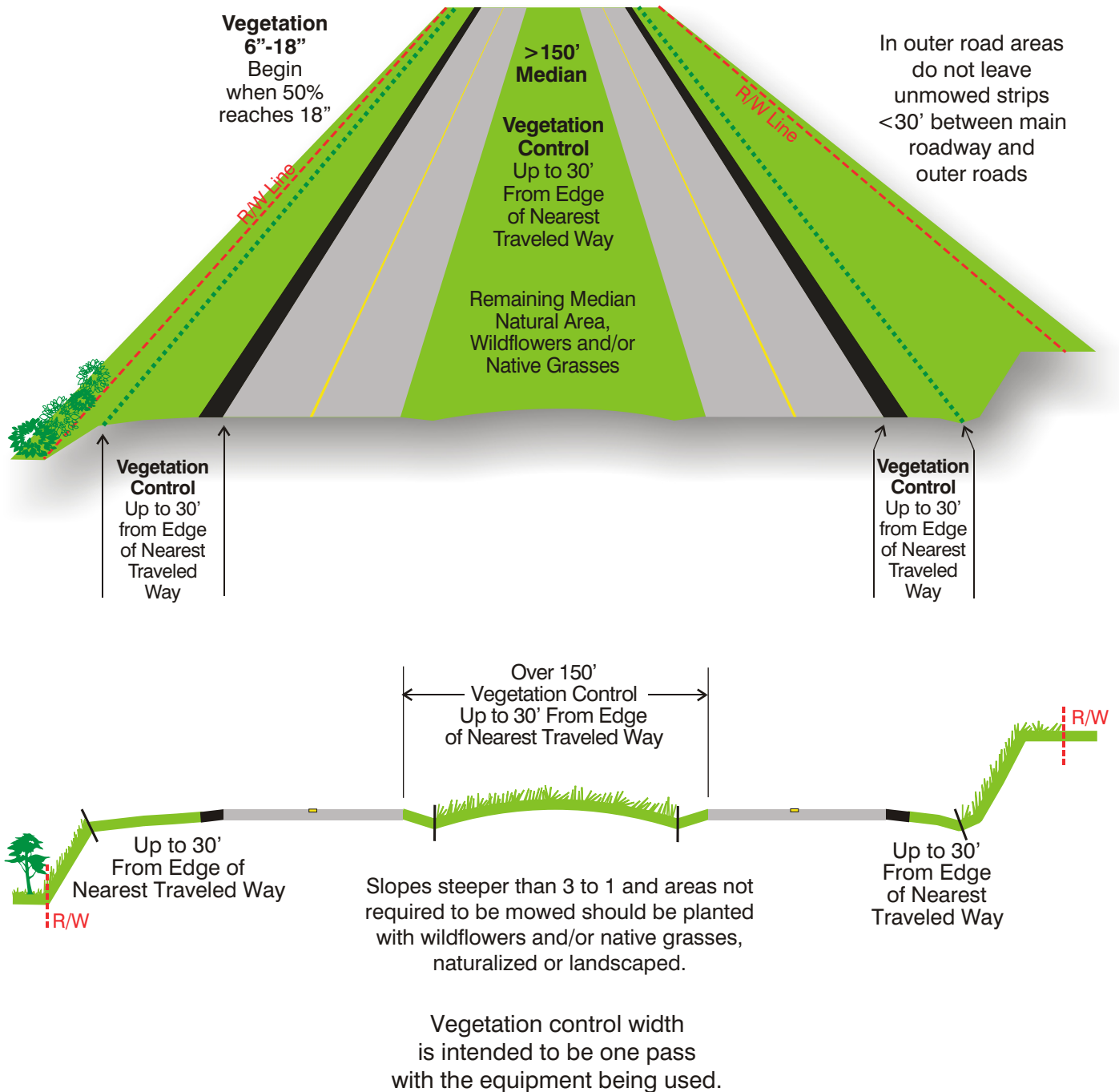
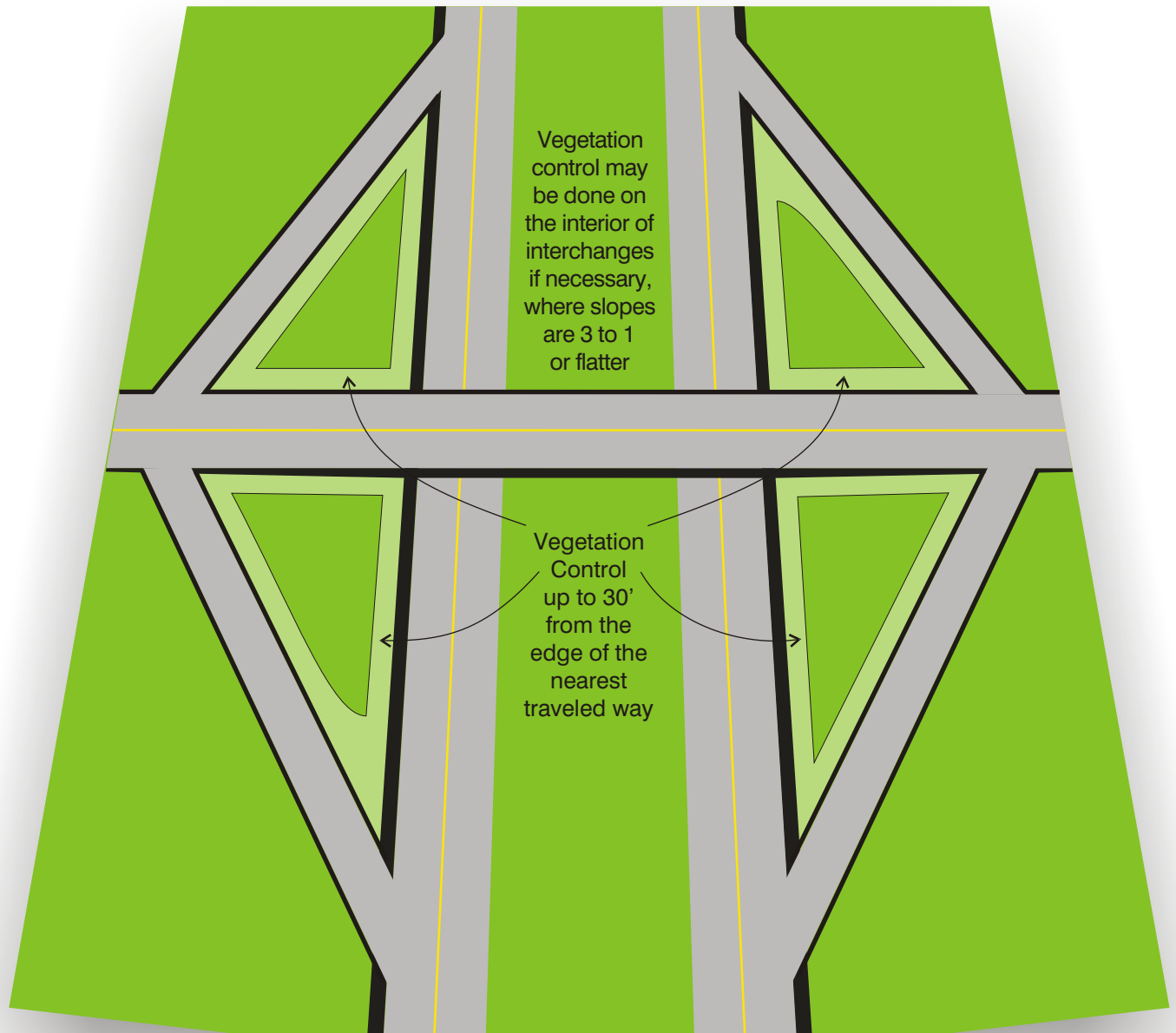


Figure 4
Interchanges



Vegetation control width is intended to be one pass with the equipment being used.

Figure 5
Type IV Management Area
 Undeveloped Areas On
 Undivided Highways

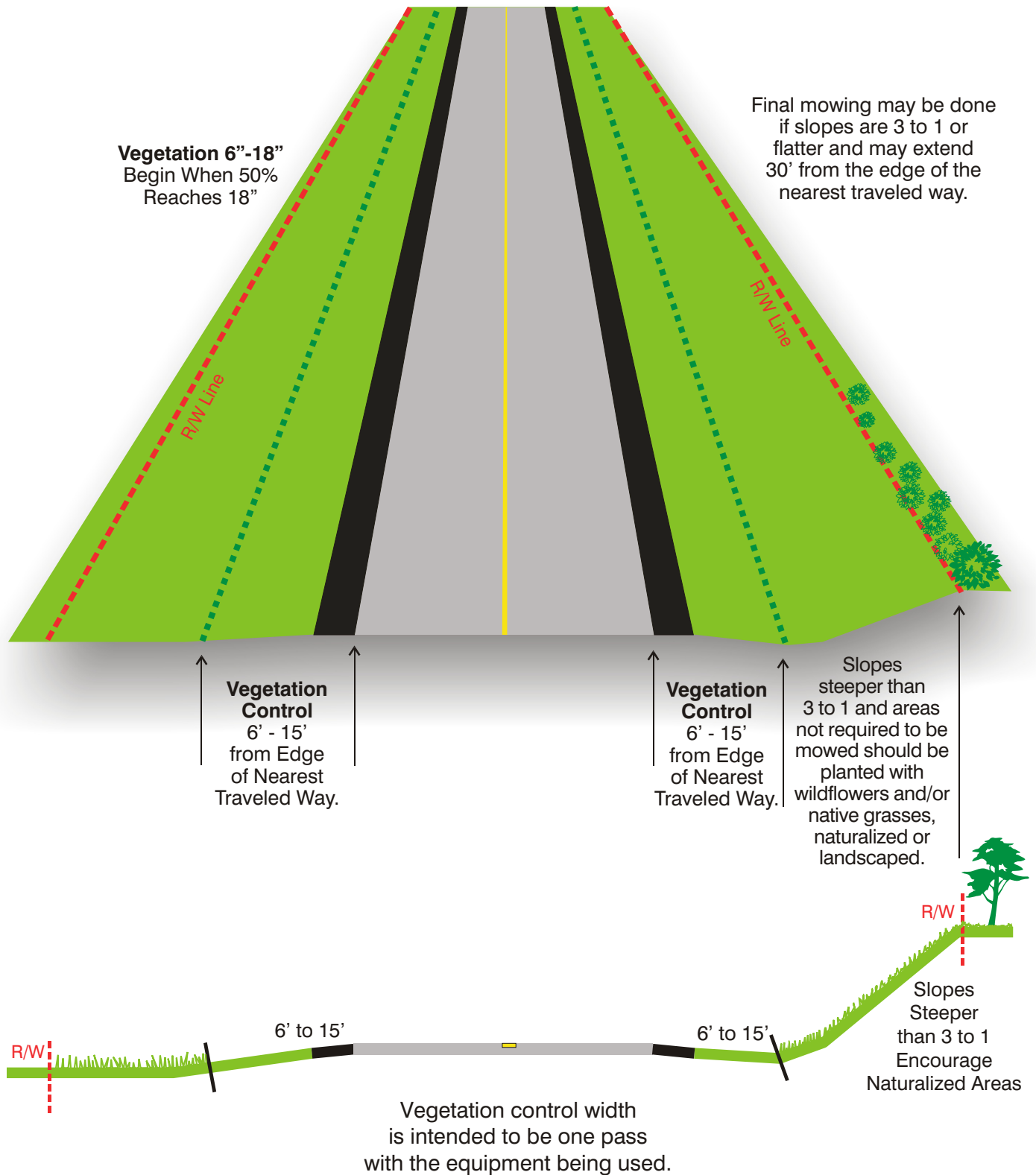


Figure 6
Native Vegetation Preventing Snow Drifts



Figure 7
Ditch Cut

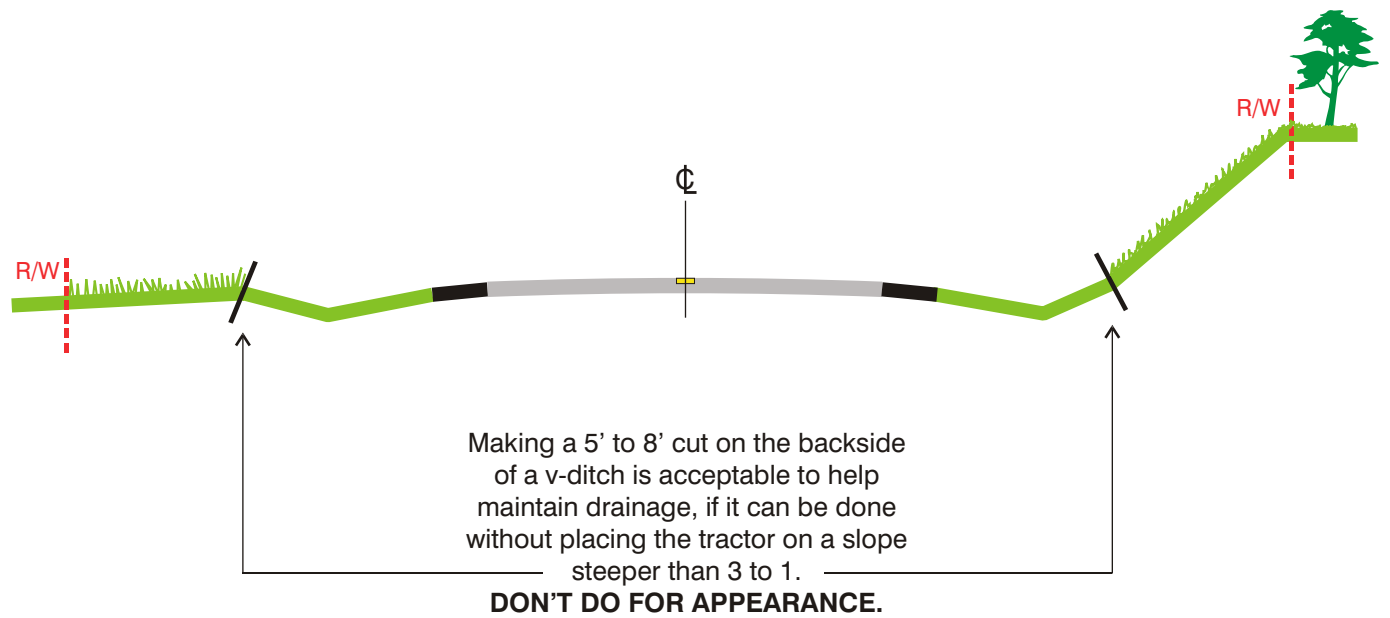


Figure 8

Wildflower and Native Grass Examples



Yellow & purple coneflower, purple beardtongue & ox-eye daisy



Big bluestem



Indian paintbrush & betony



Rudbeckia



Coreopsis



Big bluestem & rudbeckia



Indiangrass

Figure 9
Naturalized Area Examples

